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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,279	12/04/2003	Ranganathan Srinivasan	034430-034	1604

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EXAMINER	
RADTKE, MARK A	

ART UNIT	PAPER NUMBER
2165	

DATE MAILED: 08/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/729,279	SRINIVASAN ET AL.	
	Examiner	Art Unit	
	Mark A. Radtke	2165	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-92* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-92* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-92 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete because the independent claims omit essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: "sending a multidimensional database query to one or more data servers". An intended use stated in the preamble of a claim must be carried out as a result of the steps within the claim. The result of "splitting the query" does not explicitly or implicitly "send" the query.

3. Claims 4, 8, 59 and 63 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete because the independent claims omit essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: measuring the distance between members in said previous row. Furthermore, the lack of a distance measurement renders the words "closest" and "equidistant" indefinite for lacking antecedent basis.

4. Claims 10-14, 43 and 65-69 are rejected under 35 U.S.C. 112, second paragraph, because the term "extra" in claims 10-14, 43 and 65-69 is a relative term which renders the claim indefinite. The term "extra" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Determining "extra" data is an abstract concept.

5. Claims 17, 46 and 72 are rejected under 35 U.S.C. 112, second paragraph, because the phrase "basic dimensions" is indefinite. It is unclear if the dimensions of the trees are checked to verify that each node in the data grid is represented correctly, or if the "basic dimensions" refer to the dimensions of the multidimensional database.

6. Claims 22, 50 and 77 recite the limitation "row and column counts of nodes" in line 1. There is insufficient antecedent basis for this limitation in the claim.

7. Claims 24-26 and 79-81 recite the limitation "said user-provided basis for splitting" in line 1. There is insufficient antecedent basis for this limitation in the claim. The phrase has antecedent basis if the claims depend from claims 23 and 78, respectively.

8. Claims 26 and 81 are rejected under 35 U.S.C. 112, second paragraph for being indefinite. Where applicant acts as his or her own lexicographer to specifically define a

term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "user-provided" in claims 26 and 81 is used by the claims to mean "implicit based on the number of lines that can be displayed at one time on a display", while the accepted meaning is "explicitly defined by the user." The term is indefinite because the specification does not clearly redefine the term. If a user defines something, it is not defined implicitly. Paragraph [0058] relates claims 26 and 81, and it contains no explicit definition for "user-defined". Furthermore, the claims are indefinite because many users using many kinds of displays can be connected to the same database at the same time. The specification does not provide for storing multiple partitions of the same data for different users and displays, so the "splitting" of claims 26 and 81 is inconsistent with a reasonable interpretation of claim 1, wherein splitting for "sending a multidimensional database query to one or more data servers" (e.g., "load balancing") refers to routing in a distributed environment. Furthermore, the claims have no step of "displaying", so it is unclear how a computer would implicitly or explicitly determine the number of lines in a display. Furthermore, modern displays and operating systems can display a variable number of lines of text depending on the font and the state of the windowing environment.

9. Examiner notes that the large number of 35 U.S.C. 112, second paragraph, rejections has made claim interpretation difficult for the purposes of a prior art search. Specifically, the use of "splitting" in claims 26 and 81 is inconsistent with the intended use of the invention, which is to route a query prior to execution and perform the query, not to display the result. See the above rejection of claims 26 and 81. As such, the prior art rejections below are made given the Examiner's best understanding and broadest reasonable interpretation of the claims.

10. Dependant claims are rejected because they depend from rejected claims.

Claim Rejections - 35 USC § 101

11. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1-92 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The independent claims 1, 37, 56 and 92 are rejected because the result of "splitting" is intangible. "Splitting" is an abstract concept which does not imply a tangible embodiment. Examples of tangible results include "storing", "executing" or "displaying" a query.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14. Claims 1-10, 15-44, 46-65 and 70-92 are rejected under 35 U.S.C. 102(e) as being anticipated by Koskas (U.S. Pat. No. 6,564,212).

As to claim 1, Koskas teaches a method for sending a multidimensional database query, the multidimensional database query including a grid having one or more rows and one or more columns, an action range, and an operation (see Abstract), the method comprising:

creating a row tree structure (See column 9, lines 38-40 and column 9, line 45 – column 10, line 6. The thesaurus is a row tree structure.), said row tree structure representing title and header tows in the query grid (see figures 10A-H and column 4, lines 34-35);

creating a column tree structure, said column tree structure representing header columns in the query grib (See column 9, lines 19-25 and see figures 1-3, "Row-ID". The link table is a column tree structure.);

performing the operation on the row tree structure and the column tree structure (See columns 10-11, Example 1. The operation is executing the query.); and

splitting the query grid using the row tree structure and the column tree structure (see column 51, lines 30-50).

As to claims 2, 38 and 57, Koskas teaches wherein said creating a row tree structure further includes assigning members of a row in the query grid as siblings of each other in the row tree structure (see column 15, lines 46-51, "layers").

As to claims 3, 39 and 58, Koskas teaches wherein said creating a row tree structure further includes assigning members of a row in the query grid as children of members of a previous row in the query grid in the tree structure (see column 20, line 24).

As to claims 4 and 59, Koskas teaches wherein said assigning members of a row in the query grid as children includes, for each member in a row in the query grid:

assigning said member as a child of a closest member in said previous row; and

wherein if two members in said previous row are equidistant, said closest member is the first of said two members (see column 19, line 61, "Repeated values are eliminated").

As to claims 5, 40 and 60, Koskas teaches wherein each of one or more nodes in said row tree structure contains row and column information regarding a corresponding cell in the query grid (see figures 1-3, "Row-ID", "Name").

As to claims 6, 41 and 61, Koskas teaches wherein said creating a column tree structure includes assigning members of the same column of the query grid as siblings of each other in the column tree structure (see column 15, lines 46-51, "layers").

As to claims 7, 42 and 62, Koskas teaches wherein said creating a column tree structure further includes assigning members of a column of the query grid as children of members of a previous column in the query grid in the tree structure (see column 20, line 24).

As to claims 8 and 63, Koskas teaches wherein said assigning members of a column in the query grid as children includes, for each member in a column in the query grid:

assigning said member as a child of a closest member in said previous column; and

wherein if two members in said previous column are equidistant, said closest member is the first of said two members (see column 19, line 61, "Repeated values are eliminated").

As to claims 9 and 64, Koskas teaches wherein each of the one or more nodes in said column tree structure contains row and column information regarding a corresponding cell in the query grid (see column 9, lines 30-32).

As to claims 10, 43 and 65, Koskas teaches further comprising deleting extra information from the query grid (see column 19, line 61, "Repeated values are eliminated").

As to claims 15, 44 and 70, Koskas teaches further comprising modifying the action range in light of said deletion (See column 20, lines 1-2, "then". Action range is not determined until after deletion).

As to claims 17, 46 and 72, Koskas teaches further comprising checking the row and column trees to ensure all basic dimensions are represented in the trees (see column 20, lines 10-14 and column 21, lines 36-37).

As to claims 18 and 73, Koskas teaches wherein dimensions may be represented in the trees directly or through an associated attribute dimension (see column 24, lines 5-10).

As to claims 19, 47 and 74, Koskas teaches further comprising adding any basic dimensions to the trees that are not represented in the trees (see column 21, lines 37-38).

As to claims 20, 48 and 75, Koskas teaches wherein said performing the operation includes:

traversing said row tree structure in pre-order to determine if any of the nodes is in the action range (see column 33, lines 1-9);

for each node in the action range:

querying related members of the member corresponding to the node using metadata, said querying based on the operation (see column 33, lines 23-25, FUNC); and

inserting or deleting nodes of said row tree structure based on results of said querying while maintaining correct relationships in the row tree structure (see colun 33, lines 35-37, dichotomic searches).

As to claims 21, 49 and 76, Koskas teaches wherein said performing the operation further includes:

traversing said column tree structure in pre-order to determine if any of the nodes is in the action range (see column 34, lines 30-46);

for each node in the action range:

querying related members of the member corresponding to the node using metadata, said querying based on the operation (see column 34, lines 30-46, FNODE); and

inserting or deleting nodes of said column tree structure based on results of said querying while maintaining correct relationships in the row tree structure (see column 34, lines 30-46).

As to claims 22, 50 and 77, Koskas teaches further comprising changing row and column counts of nodes in said row tree structure and said column tree structure to represent said insertions and/or deletions (see column 34, lines 38-44).

As to claims 23 and 78, Koskas teaches wherein said splitting the query grid includes splitting the query grid based upon a user-provided basis for splitting (see column 20, lines 10-12, "may be made by a database manager").

As to claims 24 and 79, Koskas teaches wherein said user-provided basis for splitting is approximately equal sized number of sub-grids based on a fraction provided by the user (see column 20, lines 13-14, "distribution of words").

As to claims 25 and 80, Koskas teaches wherein said user-provided basis for splitting is a number of lines per sub-grid (see column 50, "Virtual Flat File Partitioning").

As to claims 26 and 81, Koskas teaches wherein said user-provided basis for splitting is implicit based on the number of lines that can be displayed at one time on a display (see column 40, "Query Output").

As to claims 27, 51 and 82, Koskas teaches wherein said splitting the query grid based upon a user-provided basis for splitting includes:

traversing said row tree structure to get the number of rows and columns required by the header rows of a resulting grid;

traversing said column tree structure to get the number of rows and columns required by the header columns of a resulting grid;

traversing said row tree structure to create a header row grid;

splitting said query grid into sub-grids based on said user-provided basis for splitting, said number of rows and columns required by the header rows of a resulting grid, said number of rows and columns required by the header columns of a resulting grid, and a number of rows of said header row grid; and

appending said header row grid to the top of each of said sub-grids (see figure 66).

As to claims 28, 52 and 83, Koskas teaches wherein said traversing said row tree structure to get the number of rows and columns required by the header rows of a resulting grid includes:

counting the number of siblings available at each level of said row tree structure;

counting a number of levels of said row tree structure; and

wherein said number of rows required by the header rows of a resulting grid is equal to said number of levels of said row tree structure, and said number of columns required by the header rows of a resulting grid is equal to a maximum number of siblings available at any one level of said row tree structure (see figures 69-70).

As to claims 29, 53 and 84, Koskas teaches wherein said traversing said column tree structure to get the number of rows and columns required by the header columns of a resulting grid includes:

counting a number of siblings available at each level of said column tree structure;

counting a number of levels of said column tree structure; and

wherein said number of columns required by the header columns of a resulting grid is equal to said number of levels of said column tree structure, and said number of rows required by the header columns of a resulting grid is equal to a maximum number of siblings available at any one level of said column tree structure (see figure 69-70).

As to claims 30 and 85, Koskas teaches wherein said number of rows and columns required by the header rows of a resulting grid and said number of rows and columns required by the header columns of a resulting grid make up a size for said resulting grid (see figure 66).

As to claims 31 and 86, Koskas teaches wherein said traversing said row tree structure to create a header row grid includes:

creating a header row grid of size (number of rows required by the header rows of a resulting grid, number of columns required by the header rows of a resulting grid + number of columns required by the header columns of a resulting grid); and

filling columns of said header row grid with members corresponding to nodes in said row tree structure, said filling including ensuring that any columns of said header row grid that would not be filled by members corresponding to nodes in said row tree structure remain blank and being on the leftmost side of said header row grid (see figure 66).

As to claims 32 and 87, Koskas teaches further comprising:

transmitting said split query grids to a data server for data retrieval one at a time (see column 18, lines 35-60).

As to claims 33 and 88, Koskas teaches further comprising:

transmitting said split query grids to multiple data servers simultaneously for data retrieval (see column 51, lines 30-50).

As to claims 34, 54 and 89, Koskas teaches further comprising:

receiving resultant split grids from one or more data servers;

parsing said resultant split grids to identify *n* header rows;

for each resultant split grid after the first:

discarding the first *n* rows of said resultant split grid; and

appending said remainder of said resultant split grid to said first resultant split grid (see figures 69-70).

As to claims 35 and 90, Koskas teaches wherein said parsing said resultant split grid includes:

traversing each resultant split grid row-wise until a first data item is encountered; and

wherein *n* is equal to the number of rows traversed until said first data item is encountered (see figure 69).

As to claims 36, 55 and 91, Koskas teaches further comprising:

saving said row tree structure and said column tree structure for later use (see Abstract. The database is persistent and stored in non-volatile memory).

As to claim 37, Koskas teaches an apparatus (see Abstract):

For the remaining steps of this claim applicant(s) is/are directed to the remarks and discussions made in claim 1 above.

As to claim 56, Koskas teaches an apparatus (see Abstract):

For the remaining steps of this claim applicant(s) is/are directed to the remarks and discussions made in claim 1 above.

As to claim 92, Koskas teaches a program storage device (see Abstract):

For the remaining steps of this claim applicant(s) is/are directed to the remarks and discussions made in claim 1 above.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claims 11-14, 45 and 66-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koskas.

As to claims 11-14, 45 and 66-69, Koskas teaches wherein,

extra information is deleted (see Examiner's comments regarding claim 10).

Koskas does not explicitly teach wherein said extra information includes data cells, alias information, repeated member names or external text or labels.

However, these differences are only found in the nonfunctional descriptive material and are not functionally involved in the steps recited. The determination of

extra data would be performed the same regardless of the type of data. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, (see *In re Gulack*, 703 F.2d 1381, 1385, 217 USPQ 401, 404 (Fed. Cir. 1983); *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994)).

Therefore, it would have been obvious to a person of ordinary skill in the relevant art at the time the invention was made to delete extra information based on any type of information, because such data does not functionally relate to the steps in the method claimed and because the subjective interpretation of data does not patentably distinguish the claimed invention.

As to claims 16 and 71, Koskas, as modified, teaches wherein said deleted external texts or labels are saved in a data structure with corresponding row and column information (see column 24, lines 27-39).

Additional References/ Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of art with respect to multidimensional database query splitting in general:

Document No.	**Assigned to**
US 5752016 A	Whittaker; Stephen et al.
US 6003029 A	Agrawal; Rakesh et al.
US 6003036 A	Martin; Michael W.

US 6009432 A	Tarin; Stephen A.
US 6317750 B1	Tortolani; Thomas R. et al.
US 6101556 A	Piskiel; Harold Aron et al.
US 6944818 B2	Newman; Paula S. et al.
US 20020029207 A1	Bakalash, Reuven et al.
US 6931391 B2	Tang; Zhaohui et al.
US 20010047372 A1	Gorelik, Alexander et al.
US 6492989 B1	Wilkinson; Leland
US 6947929 B2	Bruce; Jay M et al.

Y. Zhou et al. "Disk allocation methods for parallelizing grid files", IEEE, Proceedings of the 10th International Conference on Data Engineering, 1994, pages 243-252. Available online at http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=283037

F.T. Leighton. "Introduction to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes", Morgan Kauffman Pub, 1992

W.-M. Chen, G.-H. Chen, F. Hsu, "Combinatorial Properties of Mesh of Trees," ispan, p. 134, 2000 International Symposium on Parallel Architectures, Algorithms and Networks (ISPAN '00), 2000.

Warkhede, P.; Suri, S.; Varghese, G., "Fast packet classification for two-dimensional conflict-free filters," INFOCOM 2001. Twentieth Annual Joint Conference of the IEEE Computer and Communications Societies. Proceedings. IEEE , vol.3, no.pp.1434-1443 vol.3, 2001 URL: http://ieeexplore.ieee.org/iel5/7321/19795/00916639.pdf?isnumber=19795&arnumber=916639&arnumber=916639&arSt=1434&ared=1443+vol.3&arAuthor=Warkhede%2C+P.%3B+Suri%2C+S.%3B+Varghese%2C+G.

Nievergelt, J., Hinterberger, H., and Sevcik, K. C. 1984. The Grid File: An Adaptable, Symmetric Multikey File Structure. ACM Trans. Database Syst. 9, 1 (Mar. 1984), 38-71. DOI= http://doi.acm.org/10.1145/348.318586

Lee, D. T. and Wong, C. K. 1980. Quintary trees: a file structure for multidimensional datbase sytems. *ACM Trans. Database Syst.* 5, 3 (Sep. 1980), 339-353. DOI= http://doi.acm.org/10.1145/320613.320618

Bentley, J. L. 1975. Multidimensional binary search trees used for associative searching. *Commun. ACM* 18, 9 (Sep. 1975), 509-517. DOI= http://doi.acm.org/10.1145/361002.361007

Edwards, R. October 2005. Technology Audit, Business Intelligence, Hyperion System 9. Butler Group Subscription Services.

18. Any inquiry concerning this communication or earlier communications should be directed to the examiner, Mark A. Radtke. The examiner's telephone number is (571) 272-7163, and the examiner can normally be reached between 9 AM and 5 PM, Monday through Friday.

If attempts to contact the examiner are unsuccessful, the examiner's supervisor, Jeffrey Gaffin, can be reached at (571) 272-4146.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Customer Service at (800) 786-9199.

maxr
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27 August 2006

JEFFREY GAFFIN
SUPERVISORY PATENT EXAMINER
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